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EXAMINER	
PADGETT, MARIANNE L	
ART UNIT	**PAPER NUMBER**
1762	

DATE MAILED: 10/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/629,062	MAZUMDER, JYOTI	
	Examiner	Art Unit	
	Marianne L. Padgett	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *7/29/2003, 10/31/2003 & 8/9/2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) *12,13 and 15-20* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11 and 14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *10/31/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

1. Applicant's election with traverse of group 1, method claims 1-14, with election of substrate species (i) Al-based substrates & coating subspecies (i) Mo-based coatings, applied to these claims, in the reply filed on 8/9/2006 is acknowledged. The traversal is on the ground(s) that there is no undue burden to examine all claims, because they are all based on claim 1. This is not found persuasive because a product claim being based on a process claim, does not necessitate that the product actually be made by the same process, only that it has whatever structure is necessitated by the method, which in this case is virtually none, hence search of all molds, dies and tools coded by a metal deposition process constitutes a serious burden, and is well outside the necessary search for the more limited process.

No arguments were provided as to why the species were not distinct, hence applicant has failed to show any bases for traversal of the species requirement.

Applicant has also failed to list the claims readable on the elected species, hence is technically nonresponsive, however in the interest of advancing prosecution the examiner notes that claims 1-7 & 14 are generic to the method, and that claims 8-11 are directed to the elected species.

The requirement is still deemed proper and is therefore made FINAL.

2. Claims 1-11 & 14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Use relative terms, is vague and indefinite unless clear metes and bounds providing definition are found in the claims, or in a clear definition in the specification, or in cited relevant prior art. In independent claim 1, see "working surface" that could be considered relative, as what this surface is supposed to be doing is in no way limited, and "working" may mean different things to different people. In claims 2, 3 & 4, "improved" is entirely relative, and lacking in any clear metes and bounds, as there is no baseline from which to evaluate what constitutes "improved", thus no way to determine how a body or a surface of unspecified material is "improved" by deposition of unspecified metal, with or without the

"CAD" data & closed loop-direct deposit process. For further relative terms see "lightweight" in claim 7; "high" in "high-temperature" in claim 10; and "large" in "large mass" in claim 14.

In claim 1, it is unclear if modifying the body, means coding the "mold, died or tool" as a whole as might be considered implied (but not necessitated) by "deposition process", or if it requires changing the bulk material of the body somehow, which is implied by distinguishing "body" from the claimed "surface".

3. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application.for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-5 & 7-11 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 8 & 10-11 of copending Application No. 10/652,260, in view of Koch et al. (6,122, 564).

First it is noted that copending application (260) has had a notice of allowance mailed, but has not yet issued, hence is still provisional until such time as the patent issues.

The present application claims have overlapping scope with that of copending application 10/652,260, where the present claims are considerably broader, thus may be considered to encompass the specific steps of (260), considering that the optical monitoring step used with the closed-loop DMD, is consistent with the presently claimed "CAD data" (if it means computer acquired data or computer aided design), as use of such real-time dimensional monitoring & control must use computers to be precise, or it would have been obvious to one of ordinary skill to employ such a CAD system to make the claimed optical monitoring useful. Note that the coating of the aluminum substrate (die or tool) with molybdenum, will inherently produce improved life of the tools depending on the environment in which they are employed, thus reading on the claimed improved where, oxidation resistance & dissolution limitations.

Alternately, Koch et al. teach optical monitoring with a CAD system in a laser cladding process environment (abstract; col. 2, lines 10-35), hence demonstrating the obviousness of the above arguments.

Furthermore, Koch et al. notes that the dies, such as are treated in claims of (260), have cooling channels in their bodies (col. 1, lines 14-24), hence would have been a matter of conventional practice for the die bodies treated to have such channels, as they would have been obvious for their conventional usage in such tools/devices.

This is a provisional obviousness-type double patenting rejection.

5. Claims 1-7 & 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Koch et al. (6,122,564).

The very broad language of independent claim 1 is noted to have "a mold, die or tool having a working surface", where it is further noted that any "tool" encompasses any object that can be used to do something & that any surface on it that has any function can be said to be a "working surface". Therefore, while Koch et al. is directed to fabricating complete articles as a whole, not just modifying their surfaces, the present claims modify the surface or body; hence the substrate used in Koch et al. as a base on which to create an article is a "tool", where the fabrication surface is its "working surface" (abstract; figures 1-3; col. 1, lines 5-10 & 64-col. 2, line 50; col. 3, lines 30-68+, etc.). Hence, Koch et al. modify the body (substrate) and it's working surface via a laser cladding DMD process as claimed, which is CAD controlled, thus reading on the independent claim. The process is suggested for molds & dies, including those with cooling channels (col. 1, lines 13-24). As improvement of an unspecified material or object with respect to an essentially unspecified environment cannot be quantified, nor effectively evaluated, and that the change of any form or composition of a surface may favorably affect its stability, wear and/or oxidation characteristics, thus the teachings of Koch et al. are considered to sufficiently cover the relative claimed properties for claims 2-4 as written, as they provide deposition of new configurations in the substrate on which they were deposited, which need not be the same material as is being deposited.

In the example on col. 8, there are teachings of depositing a Cr-Mo steel alloy, and since this metal is thermally conductive, any addition of it can at as a heatsink, hence such additions can be considered incorporated into the "wrought H13" alloy substrate.

6. Claims 1-8, 10 & 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Weisse et al. (5,189,781).

Weisse et al. use direct deposition of metal (≡ DMD) that is controlled by a CAD/CAM system, that is considered to read on applicant's claim of "directly from CAD using a closed-loop, direct metal deposition process". In their process of making a die or mold, as depicted in figure 4, described on col. 4, line 66-col. 5, line 52, Weisse et al. make the first half of the die (60), then use their CAD controlled metal deposition process to deposit metal for the second half of the die (see reference #65), thus modifying both the working surface & the body of the first half of the die, or modifying the overall die body, respectively. The die has cooling channels 59 incorporated therein. An example of this process is also seen on col. 7, line 15-64, teachings spraying the metal zinc, and using epoxy with aluminum shot as a backing, thus teaching a body that contains aluminum as claimed. The process is also coating with zinc when the second half of the die is made. Note the zinc inner surface of the die is a working surface, that may be considered more wear, oxidation & heat resistant than the polymeric-aluminum composite backing material of the body, as well as being more stable when it is used as a die surface, than would be the backing material onto which the zinc metal shell was sprayed. Also note that the metal shell will inherently have thermal conductive heatsink characteristics, especially as it is connected to the metal frame (65 & 67) and adjacent to the cooling channels.

7. Claims 1-7 & 14 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Skszek (6,472,029 B1).

Skszek (abstract; figure 1; summary; col. 3, lines 5-61; col. 4, especially line 7-15, 30-39 & 60-col. 5, line 14) teach DMD laser based process using CAD/CAM control, where mold and die is maybe

found taught with alternating layers deposited of different materials (examples of two or three), where the materials provide different properties, such as thermal barrier (steel), or thermal conductivity (Cu), or bond coating (Ni). The process can incorporate cooling channels into the product (col. 5, lines 15-54+ & claims 10-13). Note that for the last layer made, it has been deposited on a provided (by the fabrication) mold or die substrate, and it provides its characteristic to improve the overall product, with teachings including abrasion resistance & strength. Also the stronger interface due to the use of bond coats are said to provide a metallurgical bond that avoids delamination and cracking, where the examiner notes that such protection will also provide the overall mold or die product with protection against oxidation, since if such defects occurred, they would provide ingress for oxidation into the body of the mold.

8. Claims 1-7 & 14 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-13 of U.S. Patent No. 6,472,029 B1 (Skszek), in view of Koch et al. (6,122,564).

It is noted that while the present case and Skszek (029) have different inventors, J. Mazumder & T. Skszek are seen to be coinventors in copending applications, such as 10/999,730 (2005/0121112 A1), and no assignment information is available on the present application, hence this rejection is being made due to the potential/probability of the assignments being the same.

The claims of the patent are narrower than the present claims with respect to the material deposited, and have different orders of claiming structural features, but the patent claims have overlapping ranges of limitations that are encompassed by the broader present application claims, thus represent obvious variations. The present claims are narrower with respect to the required use of CAD with the DMD used by both cases, however Koch et al. discussed in sections 4-5 above, provides teachings on the date desirability of using CAD systems with DMD processing to enable accurate control of complex shapes being processed, hence given this motivation, it would have been obvious to one of

ordinary skill in the art to employ this recommended procedure/tools for the taught control of the DMD process, with the expectation of favorable and efficient processing.

9. Claims 1-7 & 14 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-27 & 31-34 of copending Application No. 10/116,197 (also see 2002/0165634 A1).

Although the conflicting claims are not identical, they are not patentably distinct from each other because they claims in these applications have overlapping ranges of limitations, where the claims are presented in different orders, thus creating all these variations on the same theme, where the present claims are broader in that they present any substrate made by any means which is a mold, die or tool, thus encompass the narrower claims of Skszek, which specify how the substrate is provided via a lamination process.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

10. Claims 1-10 & 14 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Skszek (2002/0165634 A1).

See the claims 1-27 as discussed above in section 9, plus paragraphs [0029-30] & [0032] for aluminum or aluminum-silicon substrates.

11. Claims 1-10 & 14 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by a Mazumber et al. (2002/0142107 & 2005/0121112).

These references are noted to have overlapping inventors, but different inventive entities, with the earlier effective filing dates, and no assignment available for the present case, hence until shown that it was commonly on at the time at the invention, it is prior art. In the publications, see claims 1-24 the claim techniques, characteristics of surface deposits and structures such as cooling channels & heat sinks. Also see example 3, paragraph [0048] for aluminum or aluminum-silicon substrates.

12. Claims 1-7 & 14 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-20 of copending Application No. 10/999,730 (also see 2005/0121112 A1).

Although the conflicting claims are not identical, they are not patentably distinct from each other because they claims in these applications have overlapping ranges of limitations, where the claims are presented in different orders, thus creating all these variations on the same theme, where the present claims are broader in that they present any substrate made by any means which is a mold, die or tool, thus encompass the narrower claims of the (730) application, which specify how the substrate is provided via DMD & CAD processing.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

13. Claims 1-7 & 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koch et al. (564) as applied to claims 1-7 & 14 above, and further in view of Jeantette et al. (6,046,426).

The option of providing a mold, die or tool as a substrate, then using the claimed CAD & DMD process to modify the surface, is not taught by Koch et al. *per se*, however the background of Jeantette et al. indicates that one of laser cladding's well known & established uses is for hardfacing and improving corrosion resistance of a substrate, or to improve wear properties, corrosion resistance, thermal barrier coatings, etc., via laser cladding of similar or dissimilar materials, hence it would have been obvious to one of ordinary skill to incorporate in the laser cladding DMD/CAD process of Koch et al., a laser cladding step for providing improved surface characteristics as claimed, as such would have enabled both properties & surface properties to be optimized separately for effects indicated by Jeantette et al., which were generally known to be advantageous for molds, dies, tools, etc. as produced by Koch et al.

14. Claims 1-4 & 6-7 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Lewis et al. (5,837,960).

Lewis et al. teach a laser deposition process that uses powders (exemplary metal powders of steel, aluminum, etc.) to fabricate articles (tools, molds, dies), employing CAM & CAD computer controls, where they additionally teach that articles may have graded compositions using two different materials, so as to for example in a turbine to produce an article with a rim made of different material that has high temperature and abrasion resistant properties compared to the interior, with the overall having improved strength. It is noted that turbine high temperature conditions would be inclusive of the relative the claimed oxidation resistance & thermal barriers. Lewis et al. further teach that their process is "well-suited to coating articles" (col. 20, lines 55-68) were coating of tools such as blades are mentioned, as well as alloying by codepositing materials or forming layered structures. In Lewis et al. see the abstract; figure 1; col. 1, lines 13-25 & 37-41; col. 2, lines 40-56; summary, especially col. 3, lines 25-43 & 65-68, plus col. 4, lines 8-10 & 15-30; col. 5, lines 52-67+; col. 6, lines 29-59; examples 1-3 on col.s 10-12 for formation of articles with stainless steel powder, tungsten powder or nickel aluminide powder respectively; col. 15, lines 35-col. 16, line 60 for CAD, laser deposition & CAM techniques; col. 17, lines 20-25 & 50-65, plus col. 20, lines 1-19 for processing using stainless steel or aluminum powders; col. 18, lines 29-35 for production of internal cavities or drain holes, etc., in articles; col. 21, lines 39-col. 22, line 8 for various grading & coating techniques; col. 24, lines 29-45+ for joining dissimilar metals; and col. 25, line 41-col. 26, 111 for more techniques on grading.

15. Claims 5 & 8-10 rejected under 35 U.S.C. 103(a) as being unpatentable over Lewis et al., optionally considering Koch et al. for claim 5.

While Lewis et al. does not specifically mention cooling channels per se, they teach that their articles may incorporate cavities in drainage holes, etc., which broadly encompasses cooling channels, hence since it is old and well-known to provide cooling channels in any tool, die or mold which may be subjected to high heating during its use, so as to prevent thermal damage & extend the articles useful lifetime, it would've been obvious to one of ordinary skill in the art to employ this teaching to provide

conventional features to taught molds, dies, or tools. Alternatively, Koch et al. (column 1, lines 13-24) as discussed above provides the motivation for cooling channels asserted as obvious above

It is further noted that while suggesting articles made of aluminum & aluminum alloys, and suggesting coating the claimed process techniques, Lewis et al. do not specifically suggest coating aluminum articles via their taught technique, however it would've been obvious to one of ordinary skill in the art to apply the taught coating technique to such metal/aluminum articles formed by the laser deposition technique, especially considering that on col. 21 lines 14-22 Lewis et al. teach that such articles generally have relatively rough surface is that need further treatment, with the succeeding coating & grading teachings generically suggesting providing improved surface properties via coating, where the article already needs treatment that is by laser, especially considering that aluminum is old and well-known as a relatively soft material.

16. It is noted that Jeantette et al. discussed above (section 13) provides cumulative evidence applicable to Lewis et al. for the expected properties of a laser cladding coatings on articles.

17. Claim 11 or 8-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Skszek ((029) or (634 A1)), or Mazumber et al. ((107) or (112)), or Koch et al. in view of Jeantette et al., or Lewis et al. optionally a view of Koch et al., as applied to claims 1-10 & 14 above, as appropriate, and further in view of Hirakawa (4,505,485).

None of the above various primary references or combinations of references teach a specific combination of molybdenum alloy bonded to aluminum, however Hirakawa teach a hardening treatment for a rotating shaft (tool) to create a rotary seal via a re-melting technique, which may use a laser beam and a deposited alloying layer that is bonded to the base metal substrate via laser treatment. Applicable base metal materials include various steels or aluminum (alloys) or Al-Si alloy, where the wear-proof layer may be Cr-Mo or Mo-Ni-Cr or include molybdenum mixed with a carbide or C. In Hirakawa, see the abstract column 1, lines 5-10 & 64-column 2, line 7 & 58-67+; and column 4, line 24-column 5, line

6, especially noting column for lines 29-37 & 66-column 5 line 2. Therefore, it would have been obvious to anyone of ordinary skill in the art, given the generic teachings of the primary references/combinations, with or without teachings of aluminum substrates, to use metal surface coating techniques as taught by the primary references/combinations for the specific product of Hirakawa, as it shows the desirability of using this specific material combination, as well as teaching its formation via a laser technique process, which is suggestive of or compatible with the more specific laser deposition processes of the primary references/combinations, where the primary references/combinations provide motivation for using their technique due to its superior controllability, etc. as disclosed therein.

18. Other art of interest for relevant laser cladding techniques include through (7009137 B2) & Becker et al. (2006/0060573 A1), however they are not prior art.

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marianne L. Padgett whose telephone number is (571) 272-1425. The examiner can normally be reached on M-F from about 8:30 a.m. to 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks, can be reached at (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MLP/dictation software - 9/29-30/2006

MARIANNE PADGETT
PRIMARY EXAMINER